



# Potentials and barriers to increased wood products recycling in Norway

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“Innovative production technologies and increased  
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# Goal and scope

Just started two smaller projects to perform material flow analysis on wood waste and find solutions for recycling wood waste

Focus on construction and demolition waste of wood

Evaluate solutions for recycling of wood that have the potential to be soon commercial on an industrial scale

Discuss also literature on climate mitigation potential

# Current sawmill by-products and recovered wood market

Several closures in Norwegian pulp and paper industry the last years have given a large surplus for sawmill by-products

Large increase in export to Sweden. More difficult for recovered wood



Photo: Jørn Ole Steina



# Regulative framework

Waste Framework Directive:

That by 2020, the preparing for reuse, recycling and other material recovery shall be increase to a minimum of **70 %** for non-hazardous construction and demolition waste

(Directive 2008/98/EC)

# Energy recovery



99 % of wood  
construction  
and  
demolition  
waste is  
energy  
recovered

# Wood waste classification

Table 1: Classification of waste according to NS 9431:2011 [2].

Waste code	Classification term	Description
1141	Clean wood	Building materials, packaging, pallets, etc. without surface treatment
1142	Treated wood	Demolition wood, transport packaging, etc. treated with paint, varnish or chemicals that does not count as hazardous waste
1143	Chips, strands, bark	Also slabs
1149	Mixed processed wood	
7098	CCA-impregnated wood	Pressure impregnated wood that contains CCA
7154	Creosote impregnated wood	

# End-of-waste criteria

These requirements are:

- a) The substance or object is commonly used for specific purposes;
- b) a market or demand exists for such a substance or object;
- c) the substance or object fulfils the technical requirements for the specific purpose and meets the existing legislation and standards applicable to products;
- d) the use of the substance or object will not lead to overall adverse environmental or human health impacts

(Directive 2008/98/EC)

# Standard delivery condition for recycled wood

European Panel Federation have an industrial quality standard for reclaimed wood

Key points:

- Material shall be clean, free from rot and without degradation
- More than 2% of other materials by dry weight gives right to loss adjustment
- Moisture content below 20 %
- Limit values on chemical contamination



# Potential uses of recovered wood – raw material in particleboard manufacture

Three factories in Norway and Sweden

Two large with easy supply of sawmill by-products

One smaller factory in Norway uses mostly logs and is located far away from sawmills



Photo: Arbor

# Potential uses of recycled wood – animal bedding/landscaping



Photo: Solveig Løvø



# Climate mitigation potential

Previous study have found energy recovery of wood waste as the environmentally preferred solution (Fjellheim, 2011)

Assumption is that it substitute fossil energy and is not considering biogenic carbon effects on climate change

Recent study found that increased recovery of solid wood product will have the lowest net GHG impact in the long run regarding forest and wood utilisation in Europe (Rüter et al. 2016).



# Conclusions

Norway on a national level have a large surplus of sawmill by-products and this is an important barrier for increased recycling

Some regions of Norway far from sawmill industry, there could be a market for recycled wood chips, but there is often a lack of source separation of really clean wood

Climate change mitigation potential of recycling wood seems large when including biogenic carbon impacts and more energy is renewable



Thank you for your attention!

Questions?





# References

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

NS 9431:2011 Classification of waste

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